Forest Insect and
Disease Conditions
Interior Columbia Basin
IDAHO
NEVADA
UTAH

FOREST INSECT AND DISEASE CONDITIONS

Intermountain Region
1985

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RESUMÉ OF CONDITIONS

Tree mortality caused by mountain pine beetle decreased throughout the Region from 3.3 million trees killed in 1984 to 987,000 in 1985. Infestations continued to cause extensive tree mortality on the Ashley, Bridger-Teton, and Wasatch-Cache National Forests.

Mortality caused by spruce beetle increased dramatically on the Payette National Forest. Based on ground surveys an estimated 13,775 trees are infested. Infestations on the Boise, Bridger-Teton, and Uinta National Forests increased slightly.

Tree mortality caused by Douglas-fir beetle remained static in 1985 with approximately 3,000 trees killed. Majority of the activity was centered on the Bridger-Teton National Forest.

Total area of western spruce budworm activity in the Region increased. Host trees on approximately 2.9 million acres were defoliated. Infestations increased in extent and intensity on the Boise, Bridger-Teton, Caribou, Challis, Sawtooth, and Wasatch-Cache National Forests.

A complex of defoliators including pine needle sheathminer and sugar pine tortix defoliated 56,000 acres of lodgepole pine on the Targhee National Forest.

Leaf spot on aspen caused by Marssonina blight continues to cause severe defoliation on the Targhee, Uinta, and Wasatch-Cache National Forests.

Parasitic infections of *Armillaria* root disease were found in Utah on mature lodgepole pine killed by mountain pine beetle and also on Engelmann spruce killed by spruce beetle.

Black stain root disease of pinyon pine was detected for the first time in Idaho in the Albion Mountains near the Utah border. Areas of infection in pinyon pine were also detected on the Humboldt, Manti-LaSal, and Toiyabe National Forests.

Epidemic incidence of Elytroderma disease was detected on ponderosa pine throughout southern Idaho.

The incidence and severity of larch needlecast on the Boise and Payette National Forests are increasing.

Dwarf mistletoe suppression projects removed infected overstory trees from 4,607 acres on 13 National Forests.

Extensive frost damage was noted on high elevation spruce from Togwotee Pass in Wyoming south to the Aquarius Plateau in southern Utah.

Other pests noted were of minor or static occurrence.

ENTOMOLOGY

BARK BEETLES

Mountain Pine Beetle, *Dendroctonus ponderosae* Hopkins

Tree mortality caused by mountain pine beetle declined throughout the Region from 3.3 million trees killed in 1984 to 987,000 trees killed in 1985. Epidemic populations continue to cause significant tree mortality on the Ashley, Bridger-Teton and Wasatch-Cache National Forests. Although tree mortality on these National Forests has decreased dramatically, significant mortality will continue to occur until most of the pine trees over five inches in diameter have been killed. Virtually all the susceptible host type on these National Forests is infested with mountain pine beetle.

Mountain pine beetle activity decreased in southern Idaho. Approximately 19,000 lodgepole and ponderosa pines were killed. The largest infestations occurred throughout the lodgepole pine type on the Caribou National Forest. Significant infestations were also noted around Deadwood Reservoir and Warm Lake on the Boise National Forest, in the Sawtooth Valley, Warm Springs Creek, and Cassia Division of the Sawtooth National Forest, and in the Squaw Creek and Castle Creek drainages on the Challis National Forest. The infestation in the Castle Creek and Camas Creek vicinity on the Salmon National Forest remained static. Infestations on the Payette and Targhee National Forests declined. On the Payette National Forest mortality was concentrated in the Goose Creek, Lick Creek and Paddy Flat areas. On the Targhee National Forest most activity was noted around Palisades Reservoir.

Specific mortality figures summarized from aerial detection surveys are displayed in table 1, and the status of infestations by state is found in table 2. Locations of major infestations throughout the Region are shown in figure 1.

Spruce Beetle, *Dendroctonus rufipennis* (Kirby)

Mortality caused by spruce beetle increased throughout the Region. The most dramatic increase occurred on the Payette National Forest where aerial detection surveys noted over 2,600 Engelmann spruce trees were beetle-killed in 1985. Activity was noted on the McCall, New Meadows and Council Ranger Districts especially in the Bear Creek, Boulder Creek, Elk Meadows, Hazard Lake, Goose Lake, North Fork Payette River and Lick Creek vicinities. Evaluations and suppression activities have been initiated. Ground surveys indicate an estimated 13,775 infested trees. The locations of these Payette National Forest infestations are shown in figure 2. On the Boise National Forest fewer than 100 trees were killed by spruce beetle, however activity increased slightly from 1984.

Infestations on the Bridger-Teton National Forest continued to expand in the LaBarge and Hams Creek areas. On the Uinta National Forest, the number of beetle killed trees increased slightly in the Mill Hollow area. Aggressive management activities on the Uinta National Forest have been instrumental in minimizing the losses normally associated with a spruce beetle infestation.

Specific mortality figures, as noted by aerial detection surveys, are found in table 1.

Douglas-fir Beetle, *Dendroctonus pseudotsugae* Hopkins

Group killing of Douglas-fir by the Douglas-fir beetle occurred on the Boise, Bridger-Teton, Payette, Sawtooth, Targhee, and Uinta National Forests. Activity increased in 1985 with 4,400 trees killed. The major area of mortality occurred in the Greys River drainage on the Bridger-Teton National Forest.

In southern Idaho, the most significant increases in tree mortality were noted in the South Fork Boise River area on the Boise and Sawtooth National Forests and in both Big and Little Elk Creeks and Indian Creek on the Targhee National Forest. Elsewhere infestations were mostly static. Specific mortality figures, as noted by aerial detection surveys, are found in table 1.

Pine Engraver Beetle, *Ips pini* (Say)

Pine engraver beetle activity decreased significantly in 1985 with fewer than 600 ponderosa pines killed in southern Idaho. Mortality was noted in the Boise Basin and Fall Creek drainages on the Boise National Forest and in the Granite Mountain vicinity on the Salmon National Forest. Specific mortality figures, as noted by aerial detection surveys, are found in table 1.

TABLE 1. Number of trees killed by bark beetles in Region 4 during 1984-85 as determined by aerial detection surveys.

Forest	Year	Mountain Pine Beetle	Trend	Douglas-Fir Beetle	Trend	Ips	Trend	Spruce Beetle	Trend
Ashley	1985	778,912	Down	—	—	—	—	—	—
	1984	2,894,484	—	—	—	—	—	—	—
Boise	1985	4,828	Down	227	Up	392	Down	84	Up
	1984	14,016	—	183	—	603	—	—	—
Bridger-Teton	1985	7,943	Down	2,049	Down	—	—	226	Up
	1984	30,245	—	3,099	—	—	—	126	—
Caribou[1]	1985	7,995	Down	51	Up	—	—	—	—
	1984	13,200	—	—	—	—	—	—	—
Challis[1]	1985	1,170	Static	—	—	—	—	—	—
	1984	1,115	—	—	—	—	—	—	—
Dixie	1985	112	Static	—	—	—	—	—	—
	1984	160	—	—	—	—	—	—	—
Fishlake	1985	—	—	—	—	—	—	49	Static
	1984	—	—	—	—	—	—	56	—
Manti-LaSal	1985	269	Up	—	Down	—	—	35	Static
	1984	175	—	20	—	—	—	34	—
Payette	1985	1,090	Down	189	Down	—	—	2,604[2]	Up
	1984	2,868	—	257	—	—	—	70	—
Salmon	1985	381	Down	42	Up	120	Down	—	—
	1984	788	—	28	—	301	—	14	—
Sawtooth	1985	2,691	Static	141	Up	—	—	—	—
	1984	2,934	—	28	—	—	—	—	—
Targhee	1985	483	Down	484	Up	—	—	—	—
	1984	11,803	—	48	—	—	—	—	—
Toiyabe	1985	573	Static	—	—	—	—	—	—
	1984	676	—	—	—	—	—	—	—
Uinta[1]	1985	600	Up	20	Down	—	—	112	Up
	1984	139	—	57	—	—	—	28	—
Wasatch-Cache[1]	1985	180,217	Down	—	—	—	—	14	Up
	1984	327,539	—	—	—	—	—	—	—
TOTAL	1985	987,264		3,203		512		3,124	
	1984	3,299,466		3,720		904		328	

[1]Only portions of Forest flown; actual mortality figures are probably considerably higher.
[2]Approximately 13,775 infested trees were estimated in ground surveys.

TABLE 2. Status of mountain pine beetle infestations by state during 1985.

IDAHO

Land Ownership Class	Outbreak Area (Thousand Acres)	Number of Trees (Thousands)
National Forest	17.0	16.6
Other Federal	0.19	0.18
State and Private	1.91	1.8
TOTAL	19.1	18.6

UTAH

National Forest	467.3	939.9
Other Federal	2.7	5.6
State and Private	7.4	15.5
TOTAL	477.4	960.1

WYOMING

National Forest	9.02	6.75
Other Federal	1.16	0.87
State and Private	0.43	0.32
TOTAL	10.61	7.94

GURE 1. Areas infested by mountain pine beetle in Region 4 during 1985.

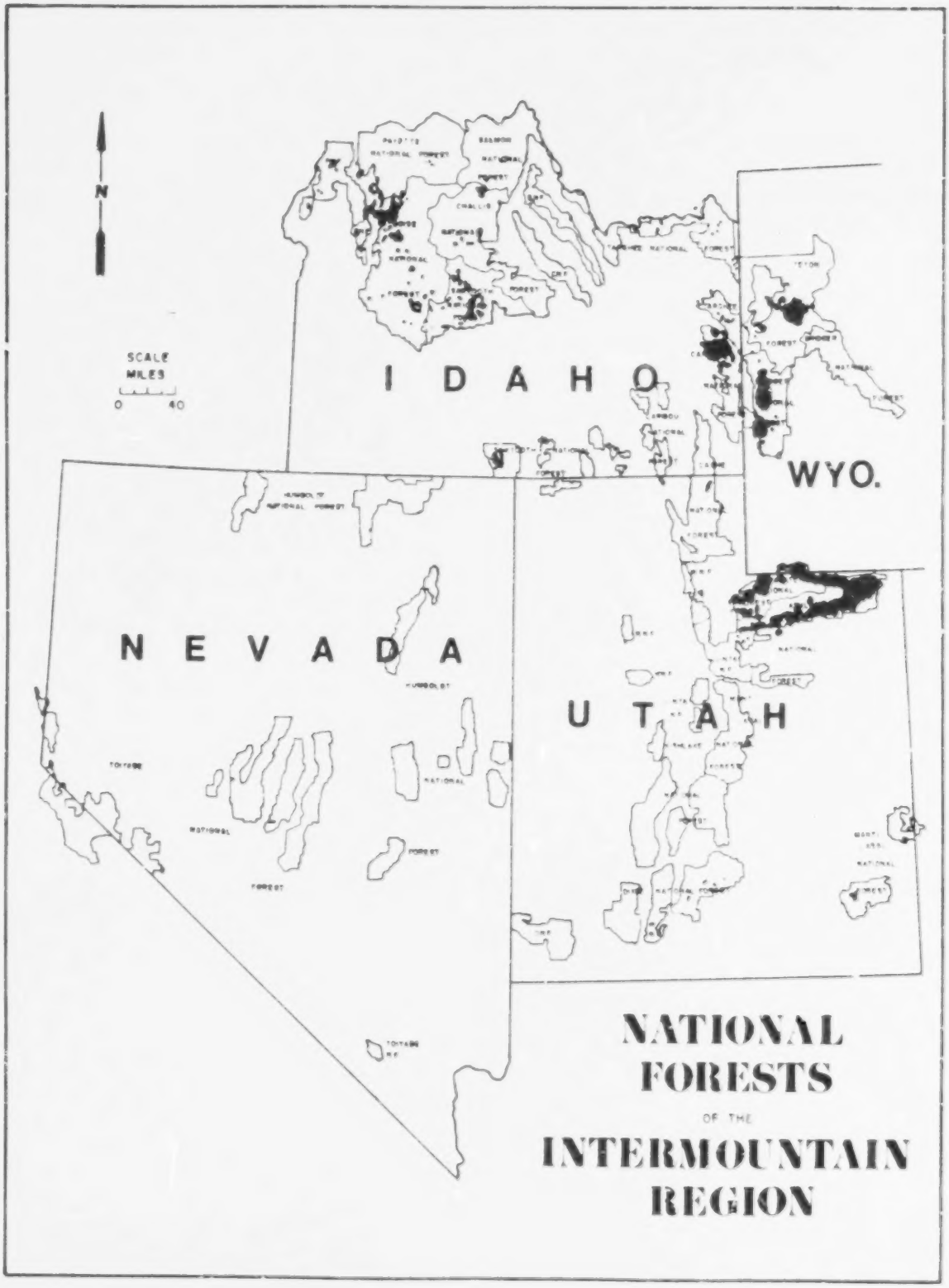
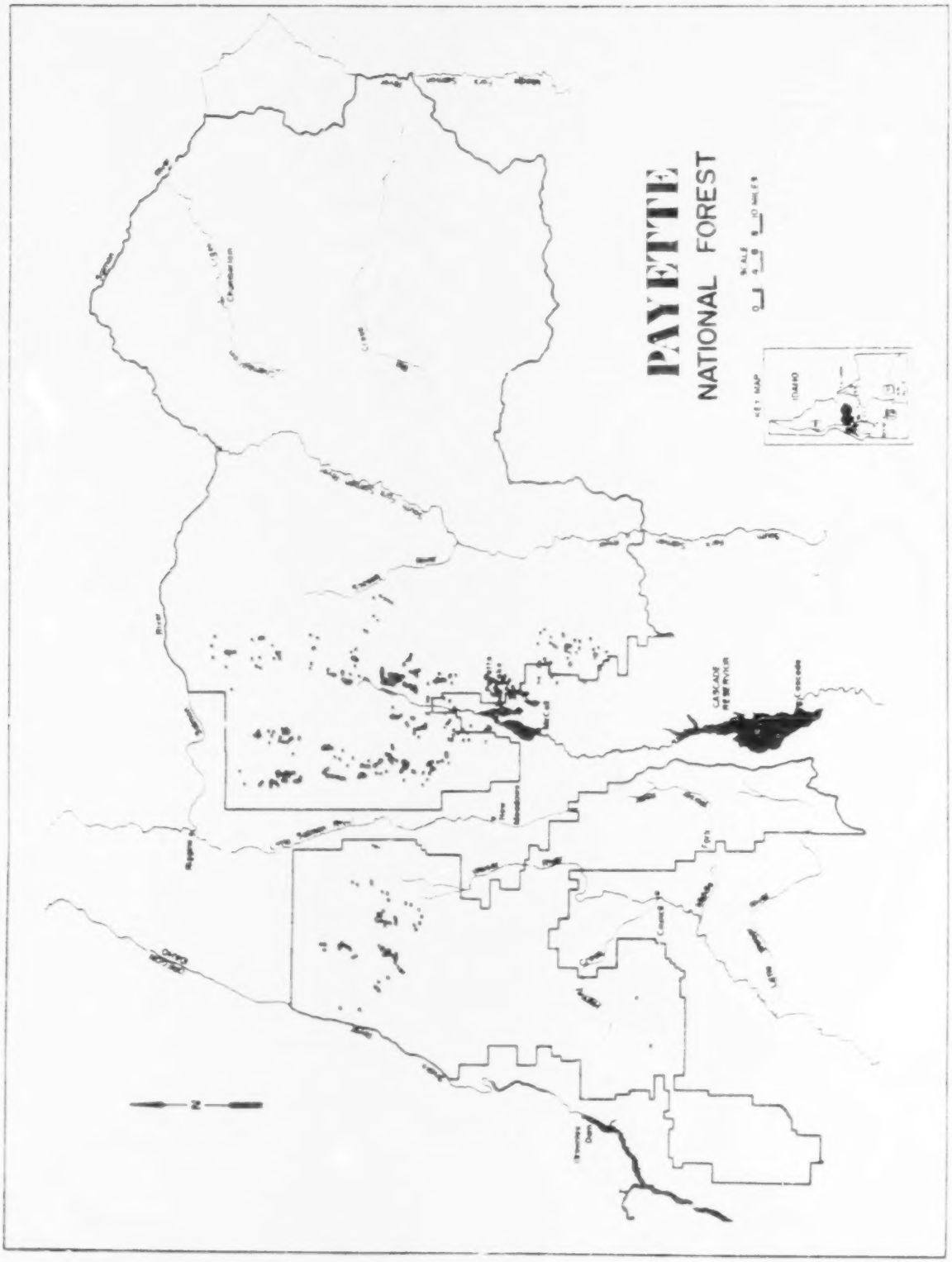


FIGURE 2. Areas infested by spruce beetle on the Payette National Forest during 1985.



DEFOLIATORS

Western Spruce Budworm, *Choristoneura occidentalis* Freeman

Western spruce budworm defoliated Douglas-fir, grand fir, and subalpine fir on 2.9 million acres in the Intermountain Region in 1985. In general, infestations increased in size and intensity throughout the Region (Figure 3).

Acreage of western spruce budworm activity in southern Idaho and western Wyoming increased over 1984 levels. Douglas-fir, grand fir, and subalpine fir on approximately 2.8 million acres were defoliated in 1985 compared to 2.0 million acres in 1984. Acreage of defoliated trees increased on the Boise, Bridger-Teton, Caribou, Challis, Payette, and Sawtooth National Forests. Infested acreage on the Salmon and Targhee National Forests remained static (Figure 4).

A general increase in defoliation intensity was detected on all the Forests with infestations. On all the Forests, with the exception of the Salmon and Bridger-Teton National Forests, the acreage of moderate to heavy defoliation increased over 1984 levels (Figure 4).

In Utah, acreage of western spruce budworm activity decreased from 1984 levels. Conifers on approximately 88,000 acres were defoliated in 1985, compared to 137,000 acres in 1984. Defoliation intensity generally decreased on all National Forests except the Wasatch-Cache National Forest (Figure 4).

Acreage infested by National Forest is displayed in table 3, and the status of infestations by state is shown in table 4. Locations of major infestations throughout the Region are identified in figure 5.

Sugar Pine Tortrix, *Choristoneura lambertiana* (Busck); and Pine Needle Sheathminer, *Zelleria haimbachi* Busck

These insects continued to defoliate lodgepole pine on the Targhee National Forest. Host trees on over 56,000 acres were infested across the Teton Mountains. Isolated small areas of defoliation of both lodgepole and ponderosa pines were also noted in other forested regions of Idaho.

Pine Butterfly, *Neophasia menapia* (Felder & Felder)

As predicted, populations of pine butterfly declined in 1985 to the point that ponderosa pine defoliation was not recorded during aerial detection surveys.

Douglas-fir Tussock Moth, *Orgyia pseudotsugata* (McDunnough)

No defoliation was noted in southern Idaho during aerial detection surveys.

Pheromone baited detection traps were placed on the Boise, Payette, and Sawtooth National Forests, State lands around Bellevue, Idaho, and in the Owyhee Mountains of southwestern Idaho. Survey results indicate populations are static to declining.

Armyworm, *Spodoptera* sp.

In late July, beds of Douglas-fir, Engelmann spruce, Jeffrey pine, lodgepole pine, and western larch at Lucky Peak Forest Nursery were invaded by larvae of armyworms. Larvae were feeding on foliage and were most numerous on Douglas-fir, and Engelmann spruce. Infested beds were successfully sprayed with the insecticide carbaryl to suppress the population.

Gypsy Moth, *Lymantria dispar* L.

No gypsy moths were found during detection surveys using pheromone baited traps. Twenty-seven developed sites were monitored in central and eastern Idaho in cooperation with the Idaho State Department of Agriculture.

TABLE 3. Areas of defoliation by western spruce budworm in Region 4 during 1984-85 as determined by aerial detection surveys.

Forest (and Adjacent Land)	Year	Defoliation Intensity: Light	Moderate	Heavy	Total	Change
Boise	1985	101,236	403,835	476,830	981,901	+195,544
	1984	290,942	308,422	186,933	786,357	
Bridger-Teton	1985	183,517	15,014	0	198,531	+21,373
	1984	149,718	26,746	694	177,158	
Caribou*	1985	—	61,035	124,119	185,154	+40,048
	1984	8,875	108,119	28,112	145,106	
Challis*	1985	46,374	39,951	13,903	100,227	+99,612
	1984	615	—	—	615	
Dixie	1985	4,277	9,077	7,750	21,104	−24,221
	1984	26,124	9,779	9,422	45,325	
Fishlake	1985	10,911	1,364	0	12,275	−19,754
	1984	23,108	6,659	2,262	32,029	
Manti-LaSal	1985	0	0	0	0	−52,149
	1984	38,580	13,569	0	52,149	
Payette	1985	81,195	166,105	280,340	527,640	+63,864
	1984	271,627	133,557	58,592	463,776	
Salmon	1985	14,389	—	—	14,389	−981
	1984	3,768	9,753	1,849	15,370	
Sawtooth	1985	25,593	122,994	186,815	335,402	+190,893
	1984	102,779	31,042	10,688	144,509	
Targhee	1985	55,446	79,126	341,061	475,633	−1,333
	1984	173,444	212,113	91,409	476,966	
Wasatch-Cache*	1985	9,726	28,133	16,367	54,226	+46,351
	1984	5,850	2,025	0	7,875	
R-4 TOTALS	1985	532,664	926,634	1,447,185	2,906,483	+559,248
	1984	1,095,430	861,784	390,021	2,347,235	

*Only portions of Forest flown; actual acreage figures are probably considerably higher

TABLE 4. Status of western spruce budworm by State during 1985

IDAHO

Land Ownership Class	Outbreak Area (Thousand Acres)
National Forest	2,460.5
Other Federal	3.1
State and Private	156.7
TOTAL	2,620.3

UTAH

National Forest	85.7
Other Federal	0.5
State and Private	1.4
TOTAL	87.6

WYOMING

National Forest	184.4
Other Federal	13.9
State and Private	0.2
TOTAL	198.5

FIGURE 3. Intensity of visible defoliation by western spruce budworm in Region 4 during 1984 and 1985.

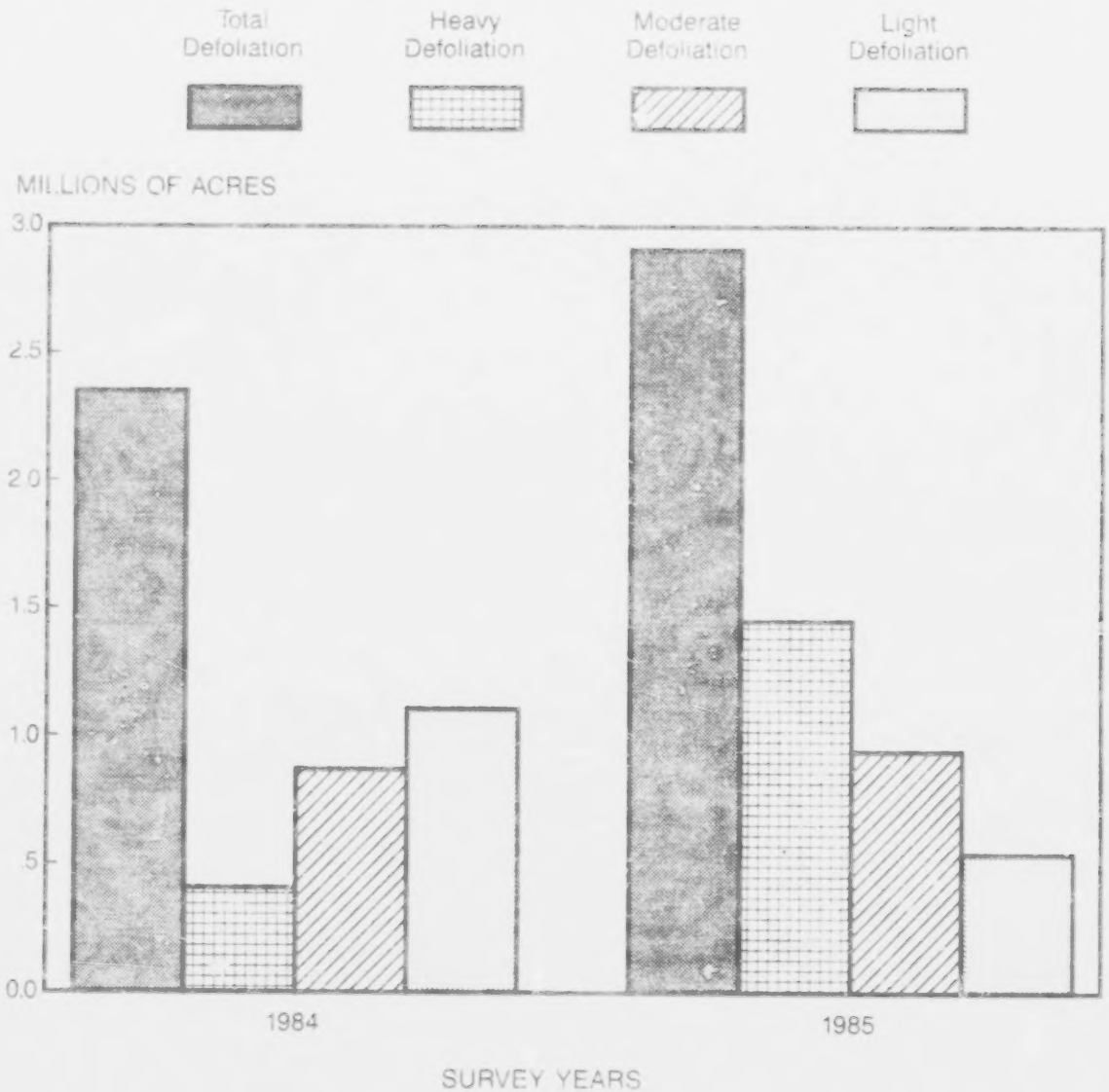


FIGURE 4. Visible defoliation in Region 4 by western spruce budworm as determined by aerial detection surveys.

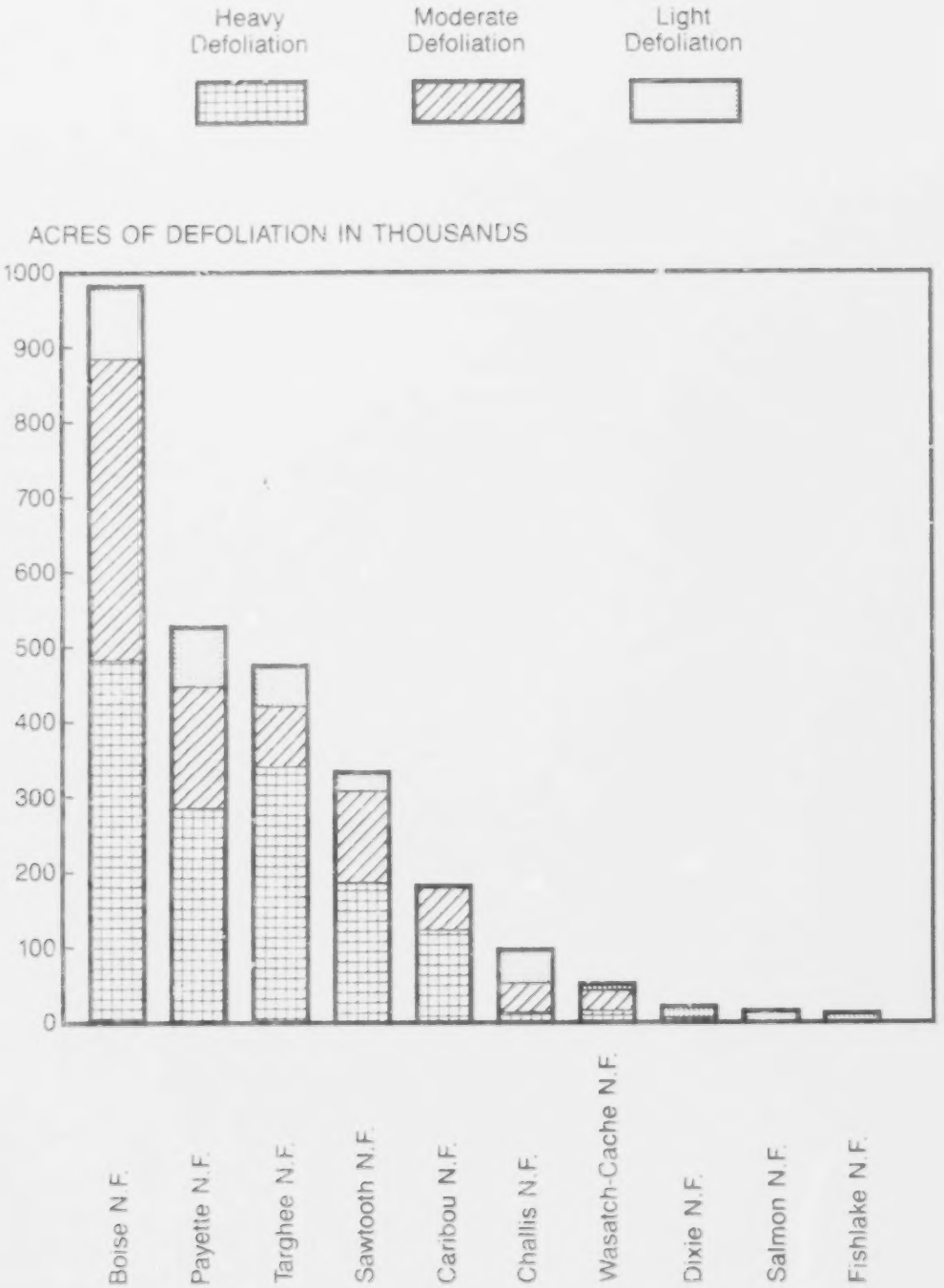


FIGURE 5. Areas defoliated by western spruce budworm in Region 4 during 1985.

Intermountain Region—Status of insects in southern Idaho, Nevada, Utah, and western Wyoming

Insect	Host	Location	Remarks
Armyworm *Spodoptera* sp.	Douglas-fir, Engelmann spruce, Jeffrey pine, lodgepole pine, western larch	Idaho	Populations defoliated seedlings at Lucky Peak Forest Nursery.
Douglas-fir beetle *Dendroctonus pseudotsugae*	Douglas-fir	Idaho, Utah, Wyoming	Group killing of Douglas-fir occurred on the Boise, Payette, Sawtooth, and Targhee National Forests, Idaho; Uinta National Forest, Utah; and Bridger-Teton National Forest, Wyoming. Activity increased in 1985 with 4,400 trees killed. The majority of the mortality was on the Bridger-Teton National Forest.
Douglas-fir tussock moth *Orgyia pseudotsugata*	Douglas-fir	Idaho	No current defoliation was observed.
Gypsy moth *Lymantria dispar*	—	Idaho	Populations were not detected by pheromone trapping in 1985.
Larch casebearer *Coleophora laricella*	Western larch	Idaho	Scattered defoliation was observed on the Payette National Forest.
Mountain pine beetle *Dendroctonus ponderosae*	Lodgepole pine, ponderosa pine, other pines	Idaho, Utah, Wyoming	Mountain pine beetle activity decreased throughout the Region. Tree mortality declined from 3.3 million in 1984 to 987,000 in 1985. However, epidemic populations continue to cause significant mortality on the Ashley and Wasatch-Cache National Forests, Utah, and the Bridger-Teton National Forest, Wyoming.
Pine butterfly *Neophasia menapia*	Ponderosa pine	Idaho	Defoliation was not noted, but small numbers of adults were observed in ponderosa pine stands.
Pine engraver beetle *Ips pini*	Pines	Idaho	A significant decrease in activity was noted. Fewer than 600 trees were killed on the Boise and Salmon National Forests.

Intermountain Region—Status of insects in southern Idaho, Nevada, Utah, and western Wyoming—Continued.

Insect	Host	Location	Remarks
Pine needle sheathminer *Zelleria haimbachi*	Lodgepole pine	Idaho	Infestations of this insect, along with the sugar pine tortrix, were detected defoliating lodgepole pine on over 56,000 acres of the Targhee National Forest.
Spruce beetle *Dendroctonus rufipennis*	Engelmann spruce	Idaho, Utah, Wyoming	Mortality increased dramatically on the Payette National Forest, Idaho. Approximately 2,600 infested trees were detected by aerial detection surveys. Based on ground surveys, an estimated 13,775 trees are infested. Infestations on the Bridger-Teton National Forest, Wyoming, and Uinta National Forest, Utah, continued to increase slightly.
Sugar pine tortrix *Choristoneura lambertiana*	Pines	Idaho	This insect, along with the pine needle sheathminer, defoliated lodgepole pine on 56,000 acres of the Targhee National Forest. Elsewhere scattered defoliation of both lodgepole and ponderosa occurred.
Western pine beetle *Dendroctonus brevicomis*	Ponderosa pine	Idaho, Nevada	Very few trees were killed by this insect. On the Toiyabe National Forest, Nevada, significant tree mortality occurred in several campgrounds on the Las Vegas Ranger District.
Western pineshoot borer *Eucosma sonomana*	Ponderosa pine	Idaho	Scattered infestations were noted.
Western spruce budworm *Choristoneura occidentalis*	Douglas-fir, spruce, true firs, western larch	Idaho, Utah, Wyoming	Conifers on about 2.9 million acres were defoliated in the Region in 1985. Infestations expanded on the Boise, Caribou, Challis, and Sawtooth, National Forests, Idaho; Wasatch-Cache National Forest, Utah; and Bridger-Teton National Forest, Wyoming. Defoliation remained static on the Payette, Salmon, and Targhee National Forests, Idaho.
Western tussock moth *Orgyia vetusta gulosa*	*Ceanothus*, willows	Idaho	Activity was insignificant in 1985.

STEM AND BRANCH DISEASES

Dwarf Mistletoes, *Arceuthobium* spp.

Dwarf mistletoe management considerations are being integrated into most plans and silvicultural prescriptions affecting timber management throughout the Region. Concurrently, dwarf mistletoe suppression projects are conducted to "clean up" a diminishing acreage of previously harvested stands in which dwarf mistletoe-infected trees were left and now provide an infection source above established regeneration. The Regional dwarf mistletoe suppression program is a sequential process of pre-suppression survey, evaluation, control, and post-control evaluation. Suppression accomplishments for 1985 are reported in table 5.

TABLE 5. Dwarf mistletoe accomplishments - Region 4, 1985.

National Forest	Suppression Project Acres
Ashley	183
Boise	699
Bridger-Teton	200
Caribou	150
Challis	70
Dixie	825
Fishlake	0
Humboldt	0
Manti-LaSal	100
Payette	272
Salmon	106
Sawtooth	54
Targhee	1,729
Toiyabe	144
Uinta	0
Wasatch-Cache	75
TOTAL	4,607

Powell Limb Rust, *Peridermium filamentosum* Pk.

Several areas of ponderosa pine infected by this fungus were detected on the Dixie National Forest. A damage rating system, based on the amount of crown affected and the position of the rust in the crown, was developed in cooperation with Utah State University personnel. This system is being evaluated to determine its utility in assessing growth loss and potential mortality.

ROOT DISEASES

Annosus Root Disease, *Heterobasidion annosum* (Fr.) Bref.

This fungus frequently becomes established in new areas by invading freshly exposed stumps. Seedling-, sapling-, and pole-sized ponderosa and Jeffrey pines throughout their range are often killed by the fungus. Young Douglas-fir are occasionally killed. In true fir and spruce, the fungus is commonly found causing a root and butt rot throughout the Region. While the fungus causes infrequent mortality of these species, infected trees are often killed by secondary bark beetles.

Armillaria Root Disease, *Armillaria* sp.

In Utah, evidence of parasitic attack by *Armillaria* sp. was found on mountain pine beetle-killed lodgepole pine on the Wasatch-Cache National Forest. Endemic mountain pine beetle populations infested mature lodgepole pine infected with Armillaria root disease more often than mature, uninfected lodgepole pines. Evidence of parasitic attack by this fungus on mature lodgepole pine was greater in a thinned stand than in an adjacent unthinned stand on the Ashley National Forest. *Armillaria* sp. was found on mature Engelmann spruce infested with spruce beetle on the Manti-LaSal National Forest.

While evidence of this fungus may be found throughout southern Idaho, in most instances it seems to function as a weak pathogen or saprophyte.

Black Stain Root Disease

A dark colored stain of roots and butts of dead and dying pinyon pine was noted for the first time in Idaho in the Albion Mountains near Utah. The stain is thought to be caused by a species of *Verticicladiella*. Identification of the fungus is pending.

Verticicladiella wageneri Kend. has been identified as causing infection centers in pinyon pine stands on the Humboldt, Manti-LaSal, and Toiyabe National Forests. Permanent plots have been established in several of these stands to determine the rate of spread of the fungus and a demonstration of disease control methods is being established in an infected stand on the Manti-LaSal National Forest.

Schweinitzii Butt Rot, *Phaeolus schweinitzii* (Fr.) Pat.

Schweinitzii butt rot is common in old growth Douglas-fir throughout southern Idaho. The fungus causing the disease is often associated with other root pathogens, primarily *Inonotus tomentosus*. Detection is largely based on occurrence of the dark-brown sporophores found at the base of infected trees; decay is also detected in windthrown trees or in stumps remaining after harvest.

BEST COPY AVAILABLE

Tomentosus Root Disease, *Inonotus tomentosus* (Fr.) Gilbn.

The fungus is frequently detected in roots of Douglas-fir throughout southern Idaho and occasionally in subalpine fir in southwestern Idaho. This year the fungus was found killing suppressed Douglas-fir seedlings in Stoddard Creek Campground, Targhee National Forest. Infection appears to originate in very small roots and extends upward into larger roots where it often merges with decay caused by other root pathogens.

Decay by this fungus occurs commonly in Utah spruce stands. The fungus has been found to survive in stumps for up to 20 years. Removal of infected stumps is being evaluated as a control method.

FOLIAGE DISEASES

Douglas-fir Needle Cast, *Rhabdocline pseudotsugae* Syd.

Epidemic levels of Douglas-fir needle cast occurred in Douglas-fir stands in eastern Idaho; most notably in the Centennial Mountains on the Idaho/Montana border. Concurrent heavy defoliation by the western spruce budworm resulted in individual and group mortality of sapling-sized trees beneath budworm-susceptible overstory trees. Elsewhere in southern Idaho the fungus occurred at endemic levels throughout the host type.

Lodgepole Pine Needle Cast, *Lophodermella concolor* (Dearn.) Darker

In addition to the areas of perennial moderate infection in the Sawtooth National Recreation Area, moderate to heavy infection was observed in many drainages around Cascade, Idaho.

**Aspen Foliage Diseases: Marssonina blight, *Marssonina populi* (Lib.) Magn.;
Septoria leaf spot and canker, *Septoria* sp.;
shoot blight of populars, *Venturia macularis* (Fr.) Mull. & Arx**

All three of these diseases were found in epidemic status, in addition to aspen leaf miner, infecting aspen foliage on the Targhee National Forest. Marssonina blight caused defoliation of aspen in stands on the Wasatch-Cache and Uinta National Forests.

Needle Rust of Pinyon Pine, *Coleosporium crowellii* Cumm.

This fungus caused defoliation of singleleaf pinyon pine in several locations: the Quinn and White Pine Divisions of the Humboldt National Forest; House, Kyle, and Macks Canyons on the Toiyabe National Forest; and the Deep Creek Mountains on the Bureau of Land Management administered lands in western Utah. Two-year-old needles were being shed and one-year-old needles contained red-orange colored rust pustules. Only current year needles remain uninfected on many severely infected trees. The widespread distribution of this disease was probably due to abnormally wet conditions occurring over the last two growing seasons.

VASCULAR WILTS

Dutch Elm Disease, *Ceratocystis ulmi* (Buism.) C. Mor.

The city of Boise, Idaho has a population of about 2,200 elm trees. In 1985, 38 trees succumbed to dutch elm disease. The long range plan for the city is to replace elms with trees requiring less maintenance.

NURSERY DISEASES

Frost Damage

Following an abrupt period of abnormally warm temperatures, a severe late April frost killed the terminal buds of thousands of two year old (2-0) Douglas-fir, Engelmann spruce, and western larch seedlings at the Lucky Peak Forest Nursery near Boise, Idaho. Later evaluations showed many lateral branches had assumed apical dominance. By late summer, evidence of the prior frost damage was very slight.

ABIOTIC

Frost Damage

Several consecutive nights of subfreezing temperatures during shoot elongation in late June caused extensive killing of new growth and reproductive flowers on spruce from Togwotee Pass in western Wyoming to the Aquarius Plateau in southern Utah. Damage was heaviest in an elevational band where development of susceptible tissues coincided with the low temperatures.

Winter Drying

Pine and fir saplings on the Boise, Payette, and Targhee National Forests exhibited symptoms of winter drying. Symptoms included red and dead needles up to about 4 feet above the snow line on south-facing portions of trees. Dead buds were found, but generally only on lateral branches. By mid-summer affected trees appeared normal as most of the red needles had dropped and new foliage masked much of the discoloration and defoliation.

Heat Defoliation

Premature loss of older needles on firs, Douglas-fir, spruce, and pines was noted during July and early August, 1985. Discoloration followed by needle drop was attributed to an exceptionally warm period, beginning in April and continuing into August, when temperatures averaged up to five degrees warmer than for similar periods in previous years. Correspondingly, precipitation was at least 25 percent below normal. Under conditions of extreme heat, it is thought the inner, older needles abscise first because heat radiation is restricted by the surrounding foliage.

Hail Damage

Hail from a severe, localized hailstorm caused branch flagging of sapling-sized ponderosa pine in a plantation about 10 miles northwest of Burgdorf, Idaho on the Payette National Forest. In some trees 30 percent to 50 percent of the branches were flagged.

Intermountain Region—Status of diseases in southern Idaho, Nevada, Utah, and western Wyoming

Disease	Host	Location	Remarks
STEM AND BRANCH DISEASES			
Aspen trunk rot *Phellinus tremulae*	Aspen	Idaho, Nevada, Utah, Wyoming	Evidence of infection may be found in most aspen stands throughout the Region.
Comandra blister rust *Cronartium comandrae*	Lodgepole pine, ponderosa pine	Idaho, Utah, Wyoming	This rust occurs infrequently on lodgepole pine. Three planted ponderosa pine stands infected with the rust have been found in southern Idaho.
Cytospora canker *Valsa sordida*	Aspen	Idaho, Nevada, Utah, Wyoming	Cankers are common on aspen throughout the Region, causing branch, top, and entire tree mortality.
Dasyscypha canker *Dasyscypha* sp.	Lodgepole pine, ponderosa pine	Idaho	This weak pathogen occasionally causes branch- and top-kill of sapling-sized pines, generally those stressed by other agents.
Dwarf mistletoes *Arceuthobium* spp.	Douglas-fir, Jeffrey pine, lodgepole pine, ponderosa pine, western larch	Idaho, Nevada, Utah, Wyoming	These are the most widespread and frequently observed pests in the Intermountain Region. Suppression projects removed infected overstory trees from 4607 acres on 13 National Forests.
Powell limb rust *Peridermium filamentosum*	Ponderosa pine	Utah	Infection was detected in stands on the Dixie National Forest. Demonstration areas have been established in cooperation with Utah State University to evaluate a damage rating system.
Red ring rot *Phellinus pini*	Douglas-fir, pines, spruce, true firs, western larch	Idaho, Utah, Wyoming	Infection is of widespread occurrence on most conifer species. In some stands up to 50% of the volume may be affected.
Rust-red stringy rot *Echinodontium tinctorium*	Grand fir, white fir, subalpine fir	Idaho, Nevada	Infection is common in old growth stands of true firs.

Disease	Host	Location	Remarks
Stalactiform blister rust *Cronartium coleosporioides*	Lodgepole pine	Idaho, Utah, Wyoming	The fungus is widespread throughout the host type in Idaho. Very heavy infection levels occur in localized areas.
Western gall rust *Endocronartium harknessii*	Lodgepole pine, ponderosa pine	Idaho, Utah, Wyoming	Infection occurs throughout the host types but the disease is only regarded as a problem in young stands where infections girdle or cull potential stem growth.
ROOT DISEASES			
Annosus root disease *Heterobasidion annosum*	Douglas-fir, lodgepole pine ponderosa pine, true firs	Idaho, Nevada, Utah, Wyoming	Detection of annosus root disease increased throughout the Region. Infection often results in mortality of young pines and Douglas-fir and in butt rot of true firs.
Armillaria root disease *Armillaria* sp.	Douglas-fir, grand fir, spruce, pines	Idaho, Utah, Wyoming	While evidence of *Armillaria* may be found throughout southern Idaho, in most instances it functions as a weak pathogen saprophyte In Utah, parasitic infections of *Armillaria* were found on mature lodgepole pine and Engelmann spruce killed by mountain pine and spruce beetles respectively.
Black stain root disease *Verticicladiella wageneri*	Pinyon pine	Idaho, Nevada, Utah	This disease was found for the first time in Idaho's pinyon pine/juniper stands in the Albion Mountains near Utah. Confirmation by culturing is pending. New areas of infection were also detected on the Humboldt and Toiyabe National Forests, Nevada and on the Manti-LaSal National Forest, Utah.
Schweinitzii butt rot *Phaeolus schweinitzii*	Douglas-fir, ponderosa pine	Idaho	Decay is common in old-growth forests, especially those having a fire or logging history. The fungus is often found associated with other root diseases and bark beetles.

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Disease	Host	Location	Remarks
Tomentosus root disease *Inonotus tomentosus*	Douglas-fir, spruce, subalpine fir	Idaho, Utah	Decay is often found in southern Idaho, frequently in conjuction with rot caused by *P. schweinitzii*. The fungus was found killing suppressed seedling-sized Douglas-fir in the Stoddard Creek Campground, Targhee National Forest, Idaho. In Utah, this disease was detected in several additional areas on the Dixie National Forest where the fungus has been found surviving in stumps for at least 20 years.
FOLIAGE DISEASES			
Dothistroma needle blight *Scirrhia pini*	Ponderosa pine	Idaho	Severe defoliation and occasional seedling mortality continued in the only confirmed area of infection of this fungus: the confluence of the Middle Fork of the Payette River and Lightning Creek.
Douglas-fir needlecast *Rhabdocline pseudotsugae*	Douglas-fir	Idaho	Epidemic infection, in conjunction with western spruce budworm feeding, caused severe defoliation and mortality to all size-classes of trees on the Targhee National Forest. Light to moderate disease incidence was found elsewhere.
Elytroderma disease *Elytroderma deformans*	Ponderosa pine	Idaho	Epidemic incidence of the disease was noted throughout the host type in southern Idaho.
Fir broom rust *Melampsorella caryophyllacearum*	Subalpine fir	Idaho, Utah, Wyoming	The disease occurs scattered throughout the host type, but infections approaching 95% incidence have been noted in stands south of Twin Falls, Idaho on the Sawtooth National Forest.
Fir needle cast *Lirula* spp.	Subalpine fir, grand fir	Idaho	Infection was noted in several drainages on the Council Ranger District, Payette National Forest.
Larch needle cast *Meria laricis*	Western larch	Idaho	Incidence and severity of infection throughout the host type on the Boise and Payette National Forests appear to be increasing after several years of very low incidence.

Disease	Host	Location	Remarks
Lodgepole pine needle cast *Lophodermella concolor*	Lodgepole pine	Idaho	Moderate to severe infection was noted in drainage bottoms on the Boise and Payette National Forests and in the Sawtooth National Recreation Area.
Marssonina blight *Marssonina populi*	Aspen	Idaho, Utah, Wyoming	Scattered incidence of light to moderate intensity was noted throughout the host type. Severe defoliation was noted on the Targhee National Forest, Idaho associated with aspen leaf miner activity. In Utah, severe defoliation was noted on the Uinta and Wasatch-Cache National Forests.
Needle rust of fir *Pucciniastrum* spp.	True firs	Idaho	Infection remained at light levels on firs.
Needle rust of pinyon pine *Coleosporium crowellii*	Pinyon pine	Nevada	Severe infection was noted on the Humboldt and Toiyabe National Forests. The epidemic was correlated with above normal precipitation during the past two growing seasons.
Septoria leaf spot *Septoria* sp.	Aspen	Idaho	This fungus was found causing moderate defoliation of aspen.
Spruce broom rust *Chrysomyxa arctostaphyli*	Engelmann spruce	Idaho, Utah, Wyoming	The perennial brooms occur throughout the host type. In some areas, numerous brooms may be found on individual trees.
Western pine-aster rust *Coleosporium asterum*	Lodgepole pine	Idaho, Utah	Occasional infections of moderate severity were noted throughout southern Idaho and on the Ashley National Forest, Utah.
VASCULAR WILTS			
Dutch elm disease *Ceratocystis ulmi*	*Ulmus* spp.	Idaho, Utah	Thirty-eight trees out of a population of around 2,200 elms were infected and subsequently removed in Boise, Idaho.
NURSERY DISEASES			
Frost damage	Douglas-fir, Engelmann spruce, western larch	Idaho	A hard, late April frost killed terminal buds of thousands of two-year-old (2-0) Douglas-fir, Engelmann spruce, and western larch seedlings at the Lucky Peak Forest Nursery.

Disease	Host	Location	Remarks
ABIOTIC			
Frost damage	Engelmann spruce	Utah, Wyoming	Several consecutive nights of below freezing temperatures during late June killed new shoots on high elevation spruce from Togwotee Pass in Wyoming to the Aquarius Plateau of southern Utah.
Hail damage	Ponderosa pine	Idaho	Hail caused branch flagging of young pine in a 50-acre plantation 10 miles northeast of Burgdorf, Idaho.
Heat defoliation	Douglas-fir, true firs, spruce	Idaho	Subnormal precipitation, compounded by above average temperatures in the winter, spring, and summer, resulted in discoloration and premature loss of old growth needles in July and early August.
Winter drying	Lodgepole pine, ponderosa pine, true firs	Idaho	Red-brown foliage was evident early in the year on saplings on the Boise, Payette, and Targhee National Forests.

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